

## WATER MANAGEMENT ACTIVITIES in the WRRL

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Increasing competition for limited water resources makes improved water management ever more important. Effective water management requires the ability to both measure and control the collection, distribution, and delivery of water. Primary WRRL programs to assist water managers are focused on:

- Water measurement technology
- Modern methods for control and operation of canal systems
- Integrated water measurement and control systems

Key components of the WRRL's efforts in this area are:

- Research and technology development
- Field demonstrations and technical assistance
- Technology transfer via training and publications

Active programs related to **Water Measurement** include:

- Development of the [WinFlume](#) computer program for calibration and design of long-throated flumes and broad-crested weirs, [www.usbr.gov/pmts/hydraulics\\_lab/winflume](http://www.usbr.gov/pmts/hydraulics_lab/winflume)
- Development of improved calibration methods for canal radial gate check structures, to facilitate accurate flow measurement and improved canal operations.
- Numerical modeling of flumes and weirs that have the potential to provide accurate flow measurement at sites where fish passage is also needed.
- Development of elbow flow-meter technology for application to piped irrigation systems.
- Development of low-cost flow meters and data recorders for on-farm open-channel applications.



Active work related to **Automated Control and Operation of Canal Systems** includes:

- Development of the patented Automated Farm Turnout (AFT). This integrated system (measuring flume, instrumentation, data logging and control electronics) automatically measures flow rates and delivers desired rates of flow to farm-scale turnouts. A licensee is now taking this device to the commercial market.
- Evaluations of water-level and gate-position sensors, control algorithms, communication equipment, computerized canal control hardware (remote terminal units), and supervisory control and data acquisition (SCADA) software on the WRRL's model canal system.
- Addition of spread-spectrum radio telemetry equipment to WRRL canal model, for use in workshops.



### Technology Transfer Workshops:

- Modern Methods for Canal Operation and Control (twice per year)
- Water Measurement (once per year)
- Specialized workshops as requested (in Denver or on-the-road)
- Presentations on Flow Measurement and Canal Automation to attendees of the annual USBR Water Management Workshops.
- Presentations at industry gatherings, as requested
- Workshop development was subsidized by WCFSP; workshops are partially tuition-supported



### Recent Field Demonstrations and Technical Assistance:

- East Bench Irrigation District (Dillon, MT)
- Several irrigation projects near Yuma, Arizona
- Several projects near Boise and Twin Falls, ID
- About 15 projects in central Utah
- Several projects in New Mexico, including the Tucumcari Project and the Navajo Project

### Recent and Active Publication Efforts:

- [Water Measurement Manual, 3<sup>rd</sup> ed.](#) — The official water measurement reference for USBR, ARS, and NRCS.
- [Water Measurement with Flumes and Weirs](#) – manual for design and construction of long-throated flumes and broad-crested weirs, co-authored with the Agricultural Research Service (Phoenix, AZ) and the International Institute for Land Reclamation and Improvement (The Netherlands).— Publication in 2001.
- Video on pipe-flow measurements for irrigation systems— joint effort of USBR, NRCS, and University of Nebraska

### Cooperators:

- USBR Science and Technology Program
- USBR Water Conservation-Field Services Program
- USBR Regional and Area Offices
- USBR Manuals & Standards Program
- Irrigation districts throughout the western U.S.
- Agricultural Research Service (Phoenix, AZ) and the International Institute for Land Reclamation and Improvement (ILRI) (The Netherlands)
- USGS, NRCS, FWS
- Universities (Utah State, Colorado State et al.)
- Navajo, Pueblo, and Colorado River Indian Tribes
- Numerous equipment manufacturers

Visit us on the web at [http://www.usbr.gov/pmts/hydraulics\\_lab](http://www.usbr.gov/pmts/hydraulics_lab)